Remarks

According to 37 C.F.R. § 1.116, after-final amendments may be admitted upon a showing of good and sufficient reasons why they are necessary. The foregoing amendments do not require further searching on the part of the Examiner and bring the case into condition for allowance or better form for appeal by addressing a concern voiced by the Examiner in the Advisory Action. Accordingly, Applicants respectfully request that the amendments be entered.

Reconsideration of this Application is respectfully requested.

Upon entry of the foregoing amendment, claims 1, 2, 5-33, 37-41, 45, 46, 48 and 49 are pending in the application, with claims 1, 48 and 49 being the independent claims. Claim 1 is sought to be amended. Support for the amendments to claim 1 may be found, for example in the Description on page 2, last paragraph where it is disclosed that "particles being obtained by complexing the nucleic acid molecules with identical or different organic cationic precursor molecules." The newly added claim language specifies that the cationic groups of the cationic precursor molecules must complex the nucleic acid molecules. Claim 1 is presented in a better form for appeal. These changes are believed to introduce no new matter, and their entry is respectfully requested.

Based on the above amendment and the following remarks, Applicants respectfully request that the Examiner reconsider all outstanding objections and rejections and that they be withdrawn.

Applicants' Invention

Applicants' claimed transfection particles are formed by associating organic cationic precursor molecules with DNA. Each precursor molecules is composed of four parts: i) at least one functional group for binding to one or more other detergent molecules; ii) at least one lipophilic residue, iii) a non-toxic recipient backbone, and iv) a cationic group (also referred to as a "headgroup") for binding to nucleic acid molecules. The positively charged headgroups of these precursor molecules associate with the negatively charged phosphate groups on the DNA. Next, the precursor molecules which have assembled about the DNA dimerize or oligomerize with one another via covalent bonds, thereby condensing the DNA and forming the claimed transfection particles. Depending on the functional group for binding to one or more other detergent molecules, linkage may occur spontaneously upon contact of the precursor molecules when bound to DNA. *See* Written Description, page 27, first full paragraph. Alternatively, linkage may need to be mediated by an additional agent, such as oxygen. The process of forming Applicants' transfection particles is described in the Written Description from the fifth full paragraph on page 26 through the second full paragraph on page 28.

Rejections under 35 U.S.C. § 112

The Examiner has finally rejected claims 1, 2, 5-33, 37-41, 45, 49, 48 and 49 under 35 U.S.C. § 112. The Examiner states that: "It is the [breadth] of [the] claimed transfection particles that is not considered enabled for one of skill in the art to make and use at the time the invention was made . . . ." PTO File Wrapper Paper No. 23, page 2, paragraph 2. Applicants respectfully traverse the § 112 rejection.

Applicants' Written Description Enables the Claims

The Description enables one of ordinary skill in the art *to use* the transfection particles. For these claims to satisfy 35 U.S.C. § 112, first paragraph, the Description merely needs to enable the skilled artisan in any one use. In the last full paragraph at page 2 of the Description it is noted that "[t]he present invention provides particles for transfecting higher eucaryotic cells with nucleic acid molecules *in vitro* and *in vivo* comprising one or more nucleic acid molecules condensed by organic cationic molecules . . . ." As discussed *infra*, the skilled artisan is familiar with how to transfect cells *in vitro* using transfection particles without undue experimentation. Furthermore, working examples have been provided in pages 68-79 of the Description to further guide the skilled artisan in the use of the claimed transfection particles. These examples describe various aspects of the transfection method including concentrations and delivery technique. One of ordinary skill in the art would be able to take any of the transfection particles encompassed by claims 8-18 and perform without undue experimentation, for example, *in vitro* transfection as described in the Description.

The Description enables one of ordinary skill in art *to make* the transfection particles. Applicants incorporate by reference the arguments made in the reply filed April 21, 2003. In summary, a method of making the transfection particles is described from the fifth full paragraph on page 26 through the second full paragraph on page 28. The Description provides guidance including, for example, how to calculate the ratio of cationic precursor to nucleotide molecules (top of page 27), how long and at what temperature to complex the cationic precursors to the nucleotide molecules (page 27, bottom paragraph), under what

conditions to effect oligomerization between cationic precursors (page 27, bottom paragraph), and how to monitor the formation of complexation (e.g., laser light scattering at bottom of page 27, CD and TEM methodologies are also described on page 31). Guidance as to the cationic precursor molecules used to make the transfection particles is given, for example, from pages 5-6 and 8-18 in the Description. Guidance as to the nucleotide molecules used to make the transfection particles is given, for example, in pages 25-26 in the Description. Furthermore, working examples have been provided in the Description which further guides the skilled artisan in the manufacture of the transfection particles of claims 8-18 (e.g., pages 37-68).

Applicants are not required to exhaustively provide experimental guidance for every potential transfection particle. Rather, the USPTO guidelines state:

> [f]or a claimed genus, representative examples together with a statement applicable to the genus as a whole will ordinarily be sufficient if one skilled in the art (in view of level of skill, state of the art and the information in the specification) would expect the claimed genus could be used in that manner without undue experimentation. Proof of enablement will be required for other members of the claimed genus only where adequate reasons are advanced by the examiner to establish that a person skilled in the art could not use the genus as a whole without undue experimentation.

M.P.E.P. (Eighth) §2164.02 (Working Examples and a Claimed Genus) (2001).

Here, the claimed genus of transfection particles all share properties with the working examples described in pages 37-79 of the written description (e.g., condensed nucleic acid complexed to precursor molecules having a function for ionic interaction with the nucleic acid and a function to form covalent bonds with other precursor molecules). These examples also enable the formation of the claimed transfection particles having intermolecularly-bonded precursor molecules.

The Examiner indicates that "the transfection particles have specific functional language that must be taken into consideration (ie. the requirement that the cationic molecules are made by 'condensing said one or more nucleic acid molecules with identical or different organic cationic precursor molecules without crosslinking any of said one or more nucleic acid molecules' and 'by linking the precursor molecules to each other with one or more covalent bonds') and thus the claimed molecules as amended must [be] capable of being made without cross[]linking, ie. by condensation with the nucleic acid molecules." PTO File Wrapper Paper No. 23, page 2, paragraph 1.

Initially, it should be understood that "crosslinking" and "condensation" are not the same. The transfection particles are made without crosslinking the nucleic acid molecules. The nucleic acid molecules condense as a result of the cationic precursor molecule crosslinking with another precursor molecule. Generally, crosslinking occurs when covalent bonds form between the nucleic acid molecules. However, in the present case, covalent bonds are formed between the ***functional groups*** of the cationic precursor molecules, not the nucleic acid molecules. Therefore, nucleic acid molecules do not crosslink. During the process, the cationic group of the precursor molecules associate with the anionic charged phosphate groups on the nucleic acid molecules. Then, the functional group of the precursor molecules covalently bond with another precursor molecule. Subsequently, the nucleic acid molecule condenses as a result of the crosslinking of the functional groups of the precursor molecules. Therefore, the claimed molecules are made without crosslinking the nucleic acid molecule.

The Examiner also indicates that: "the [breadth] of species of functional group of any thiol, acid hydrazide, aldehyde, amine and ethylene as the cationic molecule in the transfection particles " remain rejected. PTO File Wrapper No. 23, page 2, paragraph 1.

It is important to point out that the "functional group" and the "cationic group" are parts of the "cationic precursor molecule". The functional groups should not be considered as the cationic groups, as they serve different functions. The cationic groups complex with the anionic group of the nucleic acid molecule. Subsequently, the functional groups covalently bond with another functional group of another cationic precursor molecule to condense the nucleic molecule.

Applicants understand the Examiner to be alleging that the scope of the "functional group" recited in Claim 1 is too board. To the contrary, Applicants have provided sufficient guidance to enable the skilled artisan to employ functional groups without undue experimentation. The Description lists a number of non-limiting examples of chemical functionalities capable of forming covalent bonds between cationic precursor molecules: "thiol residues that react to provide disulfide bridges (-S-S-), acid hydrazides and aldehydes that provide hydrazones (-C=N-N-), amines and aldehydes that provide Schiff bases (imines, -C=N-), and amines that react with ethylene residues that are suitably substituted (e.g. halides) to provide enamines (-C=C-N-)." See Written Description, page 6, first full paragraph.

The formation of covalent bonds using the above-described chemical functionalities is well known and documented. Two thiol (-SH) groups easily oxidize to a disulfide link, -S-S-, "which hold together different peptide chains or different parts of the same chain." See Morrison and Boyd, Organic Chemistry, 4th Edition (1983), page 1157, a copy of which

is enclosed herewith as Exhibit A. Nucleophilic addition of an acid hydrazine to an aldehyde forms a hydrazone. Id. page 751, a copy of which is enclosed herewith as Exhibit B. Addition of a primary amine to an aldehyde gives a Schiff base (imine). March, Advanced Organic Chemistry: Reactions, Mechanisms, and Structure (1968), page 667, a copy of which is enclosed herewith as Exhibit C. Lastly, formation of enamines readily occurs from reaction of amines with ethylene residues that are suitably substituted. *See* STN Search Answers 2490-2500 and references cited therein, enclosed herewith as Exhibit D. Therefore, the skilled artisan can easily select and employ the functional groups without undue experimentation.

The Examiner rejected the Applicant's argument that the unpredictability of making liposomal structures is not relevant because the Applicants are not claiming liposomal composition. The Examiner stated: the "applicant is denying that references containing information on the unpredictability of making lipid based transfection vehicles that are used for transporting nucleic acids are applicable to the instant claims which are also drawn to compositions that are lipid based compositions condensed with nucleic acids." PTO File Wrapper Paper No. 23, page 2, last paragraph.

Although the references and the present applications are both related to lipid-based compositions, lipid-DNA transfection particles and liposome-entrapped DNA are not the same and should not be confused. A liposome is a specific, ordered array of particular molecules, typically lipids. Lipophile-nucleic acid complexes can take a variety of physical forms including, but not limited to liposomes that transport a nucleic acid by trapping it inside the lipid bilayer. Unlike liposomally entrapped nucleic acid, the claimed transfection particles are not required to have a liposomal structure. The claims pertain to transfection

particles formed by associating the nucleic acid with cationic precursor molecules and subsequently dimerizing or oligomerizing the cationic precursor molecules through its functional group. The nucleic acid is condensed, not trapped within a liposome vesicle. In addition, liposomal structure is not recited in the claims. Hence, predictability in the liposomal art is not relevant or applicable to whether the claimed transfection particles are enabled.

Nonetheless, the rejection alleges that formation and use of the claimed transfection particles are unpredictable based on references pertinent only to the liposomal art. Staatz *et al.*, *Liebigs Ann. Chem.* 51-57 (1989) teaches the synthesis of chiral liposome building blocks with s-Triazine as linking unit, and Staatz *et al.*, *Liebigs Ann. Chem.* 127-131(1989) describes the synthesis and aggregation behavior of chiral cysteine amphiphiles with s-Triazine as connecting unit. Similarly, Schott *et al.*, *Biochim. Biophys. Acta 940*: 127-135 (1988) ("Schott *et al.*") pertains to inactive sulfur on liposomal detergents which are incapable or prevented from forming intermolecular detergent bonds, and are ultimately used to form intermolecular bonds with antibodies. *See* Schott *et al.*, Abstract and page 128, first column, first full paragraph. Zelphati *et al.*, *J. Lipos. Res.* 7:31-49 (1997) ("Zelphati *et al.*") reviews the state of the art of nucleic acid/cationic lipid complexes beginning at p. 33. The authors conclude that "in all in vitro studies cationic lipids have improved the potency of oligonucleotides. *See* Zelphati *et al.*, p. 43, second paragraph. Lastly, the teachings of Freeman *et al.*, *Pharm. Res. 13*: 202-209 (1996) ("Freeman *et al.*") are also clearly directed to liposomes. *See* Freeman *et al.*, page 203, left column, second sentence of "DNA Formulations" section. Hence, these references are not relevant and inapplicable to any

determination of the predictability of Applicants' claimed transfection particles as an ordered bi-layer liposomal structure is not required to form the claimed transfection particles.

Applicants' claimed transfection particles are made by an entirely different process of DNA condensation. Moreover, Applicants nowhere assert that a liposome structure is required for the particles to be effective as transfection agents. Applicants' Written Description describes the process of making the claimed transfection particles from the fifth full paragraph on page 26 through the second full paragraph on page 28. Hence, unpredictability in liposomal formation is not relevant to the predictability of formation of Applicants' claimed transfection particles.

The Examiner Has Not Made a Prima Facie Showing of Non-Enablement

As previously discussed, a patent applicant's specification disclosure which contains a teaching of how to make and use the invention must be taken as enabling unless the Patent Office provides sufficient reason to doubt the accuracy of the disclosure. *In re Marzocchi*, 439 F.2d. 220, 223-224, 169 U.S.P.Q. 367, 369-370 (C.C.P.A. 1971). The evidence provided by the Examiner does not demonstrate that a skilled artisan would doubt the enablement of the claimed polynucleotides. Accordingly, the Examiner has not set forth a *prima facie* showing that the claims are not enabled.

Applicants respectfully request that the Examiner reconsider and withdraw the rejection of the claims under 35 U.S.C. § 112, first paragraph.

Conclusion

All of the stated grounds of objection and rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider all presently outstanding objections and rejections and that they be withdrawn. Applicants believe that a full and complete reply has been made to the outstanding Office Action and, as such, the present application is in condition for allowance. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

Prompt and favorable consideration of this Amendment and Reply is respectfully requested.

Respectfully submitted,

STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.

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Amendments to the Claims

Claim 1 (currently amended): A transfection particle comprising one or more nucleic acid molecules condensed by organic cationic molecules, said particle being obtained by (1) condensing said one or more nucleic acid molecules with identical or different organic cationic precursor molecules without crosslinking any of said one or more nucleic acid molecules, and (2) thereafter obtaining cationic molecules by linking the precursor molecules to each other with one or more covalent bonds, wherein said one or more nucleic acid molecules remains condensed by said cationic molecules;

wherein the cationic precursor molecules comprise:

a) at least one functional group for binding to one or more other of said precursor molecules, wherein said functional group is a dimerizable or polymerizable functional group selected from the group consisting of thiols, acid hydrazides, aldehydes, amines, and ethylene residues that are suitably substituted to provide enamines upon reaction with an amine,

b) at least one lipophilic residue,

c) a non-toxic recipient backbone, and

d) a cationic group, ~~for binding to~~ whereby said identical or different organic cationic precursor molecules complex said one or more nucleic acid molecules.

Claim 2 (original): The transfection particle of claim 1, wherein the cationic molecules are lipids obtained by dimerization or oligomerization of cationic detergent precursor molecules.

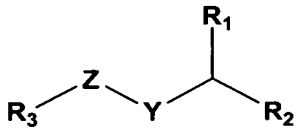
Claims 3-4 (canceled).

Claim 5 (previously presented): The transfection particle of claim 1, wherein the lipophilic residue is selected from the group consisting of lipophilic amides, esters and ethers.

Claim 6 (previously presented): The transfection particle of claim 1, wherein the functional group for binding to nucleic acid molecules is selected from an amine or derivative thereof.

Claim 7 (previously presented): The transfection particle of claim 6, wherein the functional group for binding to nucleic acid molecules is guanidine.

Claim 8 (previously presented): The transfection particle of claim 1, wherein the organic cationic precursor molecule is represented by general formula I



(I)

wherein

R_1 denotes (C_1-C_{10}-alkylene)-SH, wherein the alkylene radical may represent a straight chained or branched hydrocarbon;

R_2 denotes $-NR_4R_5$, $-NHR_4R_5^+$, $-N(R_4)_2R_5^+$, $-C(=NR_4)NR_5R_6$, guanidyl, ornithylamino, or -C(=X)-C_1-C_{10}-alkylene, wherein the alkylene radical may

represent a straight chained or branched hydrocarbon and may be substituted by up to four amino radicals $-NR_4R_5$ or a thiomonosaccharide;

R_3 denotes C_5-C_{30}-alkyl, straight chained or branched and optionally substituted with one or more halogen atoms or dialkyl amino groups, or

C_5-C_{30}-alkenyl, straight chained or branched having up to ten C=C-double bonds and is optionally substituted with one or more halogen atoms or dialkyl amino groups, or

C_5-C_{30}-alkynyl, straight chained or branched having up to ten C≡C-triple bonds and is optionally substituted with one or more halogen atoms or dialkyl amino groups, or

C_6-C_{10}-aryl optionally substituted, or

C_7-C_{16}-aralkyl optionally substituted, or a

C_5-C_{30}-alkyl-chain interrupted by up to 10 amino groups $-NR_4-$ and having optionally an amino-group which is optionally substituted by an amino acid;

R_4, R_5 and R_6 denote independently from each other hydrogen or C_1-C_4-alkyl;

X denotes O or S;

Y denotes C=O or C=S and

Z denotes O, S or $-NR_4-$.

Claim 9 (previously presented): The transfection particle of claim 8, wherein the cationic precursor molecules correspond to general formula I, wherein

R_1 denotes (C_1-C_6-alkylene)-SH, wherein the alkylene radical may represent a straight chained or branched hydrocarbon;

R_2 denotes $-NR_4R_5$, $-NHR_4R_5^+$, $-N(R_4)_2R_5^+$, $-C(=NR_4)NR_5R_6$, guanidyl, ornithylamino, or $-C(=X)-C_1-C_4$-alkylene, wherein the alkylene radical may represent a straight chained or branched hydrocarbon and may be substituted by up to four amino radicals $-NR_4R_5$ or a thiomonosaccharide;

R_3 denotes C_5-C_{20}-alkyl, straight chained or branched and optionally substituted with F, Cl, Br or $-NR_4R_5$, or

C_5-C_{20}-alkenyl, straight chained or branched having up to five C=C-double bonds and is optionally substituted with F, Cl, Br or $-NR_4R_5$, or

C_5-C_{20}-alkynyl, straight chained or branched having up to five C≡C-triple bonds and is optionally substituted with F, Cl, Br or $-NR_4R_5$, or

C_6-C_{10}-aryl optionally substituted with C_1-C_4-alkyl, F, Cl, Br or $-NR_4R_5$, or

C_7-C_{14}-aralkyl optionally substituted with C_1-C_4-alkyl, F, Cl, Br or $-NR_4R_5$, or

a C_5-C_{20}-alkyl chain interrupted by up to 10 amino groups $-NR_4-$ and having optionally an amino group which is optionally substituted by an amino acid;

R_4, R_5 and R_6 denote independently from each other hydrogen or C_1-C_4-alkyl;

X denotes O or S;

Y denotes C=O or C=S and

Z denotes O, S or $-NR_4-$.

Claim 10 (previously presented): The transfection particle of claim 8, wherein the cationic precursor molecules correspond to general formula I, wherein

R_1 denotes (C_1-C_4-alkylene)-SH, wherein the alkylene radical may represent a straight chained or branched hydrocarbon;

R_2 denotes $-NR_4R_5$, $-NHR_4R_5^+$, $-N(R_4)_2R_5^+$, $-C(=NR_4)NR_5R_6$, guanidyl, ornithylamino, or -C(=X)-C_1-C_4-alkyl, wherein the alkyl radical may represent a straight chained or branched hydrocarbon and may be substituted by up to four amino radicals $-NR_4R_5$, or a thiomonosaccharide;

R_3 C_5-C_{12}-alkyl, straight chained or branched and optionally substituted with F, Cl, Br or $-NH_2$, or a

C_5-C_{15}-alkyl chain interrupted by up to 7 amino groups $-NR_4-$ and having optionally an amino group which is optionally substituted by the amino acid cysteine;

R_4, R_5 and R_6 denote independently from each other hydrogen or methyl, ethyl, propyl, iso-propyl, n-butyl, iso-butyl or tert-butyl;

X denotes O or S;

Y denotes C=O or C=S and

Z denotes O, S or $-NR_4-$.

Claim 11 (previously presented): The transfection particle of claim 8, wherein the cationic precursor molecules correspond to the general formula I, wherein

R_1 denotes $-CH_2-SH$;

R_2 denotes $-NH_2$, $-NH_3^+$, $-C(=N^+H_2)NH_2$, guanidyl, ornithylamino, or -C(=O)-C_1-C_4-alkyl straight chained or branched and optionally substituted with F, Cl, Br or $-NH_2$,

or an ornithine radical or a S-galactosyl radical;

R_3 denotes a C_6-C_{15}-alkyl radical straight chained or branched and optionally substituted with F, Cl, Br or $-NH_2$;

Y denotes C=O;

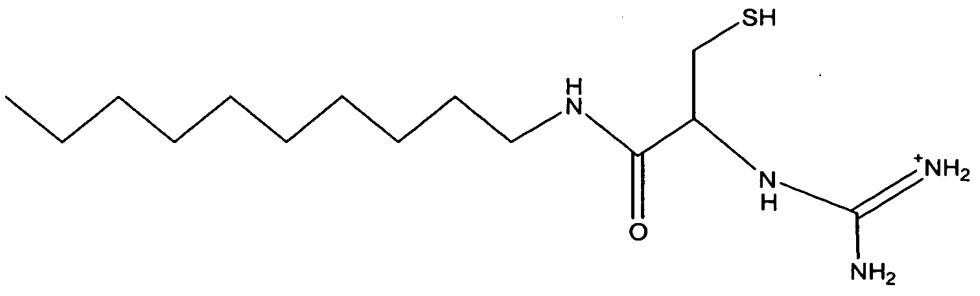
Z denotes O or -NH-.

Claim 12 (previously presented): The transfection particle of one of claims 8 to 11, wherein R_2 is guanidine or ornithylamino.

Claim 13 (previously presented): The transfection particle of claims 8 to 11, wherein R_3 is a decyl radical.

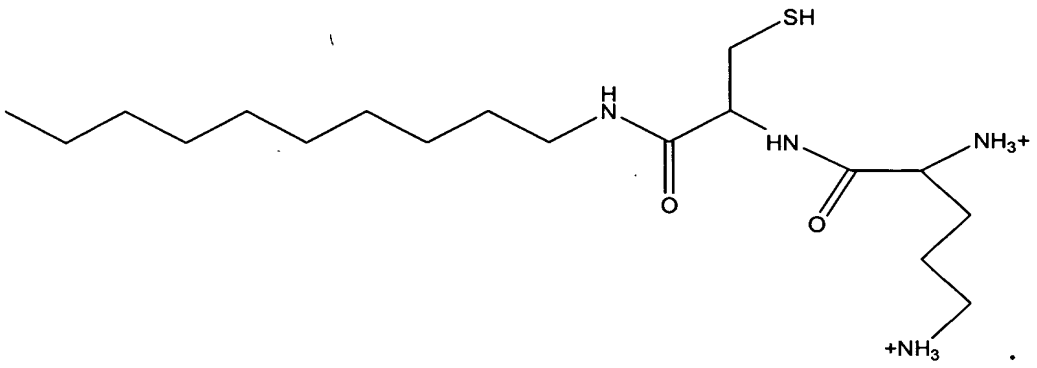
Claim 14 (previously presented): The transfection particle of one of claims 8 to 11, wherein R_1 is a methylenethiol, R_2 is guanidine, R_3 is a straight chained decyl radical, Y is a carbonyl, Z is an amine, and pharmaceutically acceptable salts thereof.

Claim 15 (previously presented): The transfection particle of claim 14, wherein the cationic molecule has the following formula:



Claim 16 (previously presented): The transfection particle of one of claim 8 to 11, wherein R_1 is a methylenethiol, R_2 is an ornithylamino, R_3 is a decane, Y is a carbonyl, Z is an amine, and pharmaceutically acceptable salts thereof.

Claim 17 (previously presented): The transfection particle of claim 16, wherein the cationic molecule has the following structure:



Claim 18 (previously presented): The transfection particle of one of claim 8 to 10, wherein the monosaccharide which is bonded via a sulfur atom is selected from the group consisting of galactose, lactose, glucose, arabinose, fructose, sorbose, xylose, ribose, mannose each of them in their D- or L-form.

Claim 19 (original): The transfection particle of claim 1, wherein the cationic precursor molecule is a polyamine.

Claim 20 (original): The transfection particle of claim 19, wherein the cationic precursor molecule is a spermine derivative.

Claim 21 (original): The transfection particle of claim 20, wherein the cationic precursor molecule is spermine-N1,N12-bis-cysteineamide.

Claim 22 (previously presented): The transfection particle of claim 1, wherein the one or more covalent bonds between the cationic molecules are degradable under reductive or slightly acidic conditions, or in the presence of enzymes.

Claim 23 (original): The transfection particle of claim 1 which comprises a single nucleic acid molecule.

Claim 24 (original): The transfection particle of claim 1 or 23, wherein the nucleic acid molecule is a DNA molecule.

Claim 25 (original): The transfection particle of claim 24, wherein the DNA molecule is a plasmid.

Claim 26 (original): The transfection particle of claim 1, wherein the nucleic acid molecule is an RNA molecule.

Claim 27 (previously presented): The transfection particle of claim 1, characterized in that it is linked via one or more covalent bonds to one or more members of the group consisting of protein ligands, sugar residues, fusogenic peptides, viruses, adenoviruses, and combinations thereof.

Claim 28 (previously presented): The transfection particle of claim 27, wherein said one or more members of the group are linked via said one or more covalent bonds to the cationic molecules.

Claim 29 (previously presented): The transfection particle of claim 27, wherein said one or more members of the group are linked via said one or more covalent bonds to nucleic acid binding molecules that are present in addition to the cationic molecules.

Claim 30 (previously presented): The transfection particle of claim 27, wherein said one or more members of the group is a protein ligand.

Claim 31 (previously presented): The transfection particle of claim 27, wherein said one or more members of the group is a sugar residue.

Claim 32 (previously presented): The transfection particle of claim 31, wherein the sugar residue is galactose.

Claim 33 (previously presented): The transfection particle of claim 31, wherein the sugar residue is mannose.

Claims 34-36 (canceled).

Claim 37 (previously presented): The transfection particle of claim 27, wherein said one or more members of the group is a fusogenic peptide.

Claim 38 (previously presented): The transfection particle of claim 27, wherein said one or more members of the group is a virus.

Claim 39 (original): The transfection particle of claim 38, wherein the virus is an adenovirus.

Claim 40 (previously presented): A method for preparing transfection particles of claim 1, wherein cationic precursor molecules are added to nucleic acid molecules in a suitable buffer, allowed to form complexes with the nucleic acid and allowed to covalently link to identical or different cationic precursor molecules on the nucleic acid template.

Claim 41 (original): The method of claim 40, wherein the cationic precursor molecules are lipophilic and are allowed to covalently link under mild oxidative conditions.

Claims 42-44 (canceled).

Claim 45 (previously presented): A kit of parts comprising one or more nucleic acid molecules, one or more cationic precursor molecules, suitable buffers, and other reagents or mechanical devices that are useful for preparation or purification of a transfection particle of claim 1.

Claim 46 (previously presented): The kit of parts of claim 45 comprising in addition one or more members of the group consisting of nucleic acid binding molecules that are present in addition to the cationic molecules, protein ligands, sugar residues, fusogenic peptides, viruses, adenoviruses, and combinations thereof.

Claim 47 (canceled).

Claim 48 (previously presented): A transfection particle comprising:

a) one or more nucleic acid molecules;

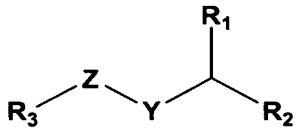
b) identical or different organic cationic precursor molecules linked to each other via one or more covalent bonds;

wherein said precursor molecules are ionically associated with said one or more nucleic acid molecules without forming any crosslinks between said nucleic acid molecules and said cationic precursor molecules, thereby condensing said one or more nucleic acid molecules.

Claim 49 (previously presented): A transfection particle comprising one or more nucleic acid molecules condensed by organic cationic molecules, said particle being obtained by (1) condensing said one or more nucleic acid molecules with identical or

different organic cationic precursor molecules without crosslinking any of said one or more nucleic acid molecules, and (2) thereafter obtaining cationic molecules by linking the precursor molecules to each other with one or more covalent bonds, wherein said one or more nucleic acid molecules remains condensed by said cationic molecules;

wherein the organic cationic precursor molecule is represented by general formula I



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wherein

R_1 denotes (C_1-C_{10}-alkylene)-SH, wherein the alkylene radical may represent a straight chained or branched hydrocarbon;

R_2 denotes $-NR_4R_5$, $-NHR_4R_5^+$, $-N(R_4)_2R_5^+$, $-C(=NR_4)NR_5R_6$, guanidyl, ornithylamino, or -C(=X)-C_1-C_{10}-alkylene, wherein the alkylene radical may represent a straight chained or branched hydrocarbon and may be substituted by up to four amino radicals $-NR_4R_5$ or a thiomonosaccharide;

R_3 denotes C_5-C_{30}-alkyl, straight chained or branched and optionally substituted with one or more halogen atoms or dialkyl amino groups, or

C_5-C_{30}-alkenyl, straight chained or branched having up to ten C=C-double bonds and is optionally substituted with one or more halogen atoms or dialkyl amino groups, or

C_5-C_{30}-alkynyl, straight chained or branched having up to ten C≡C-triple bonds and is optionally substituted with one or more halogen atoms or dialkyl amino groups, or

C_6-C_{10}-aryl optionally substituted, or

C_7-C_{16}-aralkyl optionally substituted, or a

C_5-C_{30}-alkyl-chain interrupted by up to 10 amino groups -NR_4- and having optionally an amino-group which is optionally substituted by an amino acid;

R_4, R_5 and R_6 denote independently from each other hydrogen or C_1-C_4-alkyl;

X denotes O or S;

Y denotes C=O or C=S and

Z denotes O, S or -NR_4-.